

**Application No.: 10/718,581**

**REMARKS**

Claims 1, 18 and 19 are the sole independent claims and stand rejected under 35 U.S.C. § 102/103 over Moosburger and Lin and combinations thereof. These rejections are respectfully traversed for the following reasons.

**A. Moosburger**

Each of claims 1, 18 and 19 embodies a semiconductor layered structure which has a photonic crystal structure on a *front* surface thereof. In contrast, as shown in Fig. 1, the semiconductor layered structure of Moosburger (one end thereof is expressed as ridge waveguide and the other end thereof is expressed as cleaved mirror) is provided with a photonic crystal structure on a *side* surface thereof. Indeed, because Moosburger is expressly designed to provide the photonic crystal structure as a high function mirror on the side surface (ridge waveguide) of the semiconductor layered structure that tends to become rough in cleaving, Moosburger teaches away from providing the photonic crystal structure on the front surface of the semiconductor layered structure having the cladding layers and the active layer.

**B. Lin**

Each of claims 1, 18 and 19 embodies a hole supplied from the lower electrode through the lower cladding layer and an electron supplied from the upper electrode through the upper cladding layer are re-coupled to each other within the active layer to thereby generate light in a region of the photonic crystal structure which does not overlap with the upper electrode as seen in the plan view and a region of the photonic crystal structure which overlaps with the upper electrode as seen in the plan view. According to one aspect of the present invention, by causing the active layer to function as the active layer in which the hole and the electron are re-coupled to each other to generate light in the specified regions, the light radiates in the direction perpendicular to the resonator direction.

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On the other hand, turning to Lin, only an active layer (156) that is located immediately under an upper electrode 184, which is included in a semiconductor layered structure comprising layers 140, 150, and 160, functions as an active layer (e.g., layer within which a hole and an electron are re-coupled to each other to generate light). As indicated by an arrow 190 in Fig. 1 of Lin, a current flows only in regions 154, 156, and 158 that are located immediately under the upper electrode 184, when flowing between electrodes 184 and 182.

This is due to the fact that, as explained in col. 7, line 18 - col. 8 of Lin (and Fig. 4), a region (162) of the upper cladding layer 160 is an insulating layer which results from oxidization and thermal treatment. A region (157) of the active layer 150 is disordered, and does not function as a layer in which a hole and an electron are re-coupled to each other to generate light. The reason why the region that does not overlap with the upper electrode 184 is the insulating layer and is disordered is that photonic crystal structures 132 and 134 function as mirrors (see PBG mirrors in abstract) as expressly set forth by Lin.

In other words, in order to enable the photonic crystal structures 132 and 134 to function as mirrors, no light should be generated immediately under the photonic crystal structures 132 and 134. For this reason, the region (162) is the insulating layer and the region (157) of the active layer 150 is disordered. Accordingly, light leaking from the mirror radiates from the side surface of the semiconductor layered structure as indicated by reference numeral 105.

As anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed, either expressly or inherently (noting that "inherency may not be established by probabilities or possibilities", *Scaltech Inc. v. Retec/Tetra*, 178 F.3d 1378 (Fed. Cir. 1999)), in a single prior art reference, *Akzo N.V. v. U.S. Int'l Trade Commission*, 808 F.2d 1471 (Fed. Cir.

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1986), based on the forgoing, it is submitted that the cited prior art does not anticipate the independent claims, nor any claim dependent thereon. The Examiner is directed to MPEP § 2143.03 under the section entitled "All Claim Limitations Must Be Taught or Suggested", which sets forth the applicable standard for establishing obviousness under § 103:

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (citing *In re Royka*, 180 USPQ 580 (CCPA 1974)).

In the instant case, the pending rejections do not "establish *prima facie* obviousness of [the] claimed invention" as recited in the independent claims because the proposed combinations fail the "all the claim limitations" standard required under § 103.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplmatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as the independent claims are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections under 35 U.S.C. § 102/103 be withdrawn.

**CONCLUSION**

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If


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there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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